

REACTIONS OF ALKALI METAL COMPOUNDS DURING COAL GASIFICATION FOR ELECTRIC POWER GENERATION.* Sven A. Jansson, Westinghouse Research Laboratories, Pittsburgh, Pa., 15235.

Alkali metal compounds cause hot corrosion and fouling in gas turbines. The extent of alkali release during gasification of coal depends largely on the chemical composition of alkali compounds in coal and on the chemical reactions of these compounds in the coal gas environment. This paper describes results from a study of alkali metal reactions during different steps of the gasification process. Thermochemical calculations and diagrams are used to determine the probable reaction processes, the nature of any volatile alkali metal species, and the composition of solid or liquid reaction product ash components. The calculations show that chlorine promotes alkali release through the formation of highly volatile alkali chlorides. Hydrogen chloride is another important reaction product. As the coal gas is burned with air and expanded through a gas turbine, the alkali chlorides react with sulfur compounds in the gas to form sulfate deposits.

Calculations have been made to determine the effects of different levels of alkali metal, sulfur, and chlorine on condensation temperature and the nature of turbine deposits.

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